Alberta
HUMAN RESOURCES AND EMPLOYMENT

the people & workplace department

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Occupational Injuries and Diseases in Alberta

Tar Sands
1996 to 2000

Upstream Oil and Gas
Sub-Sector #6

TABLE OF CONTENTS

1. Introduction 1

2. Sub-Sector Description 2

3. Lost-Time Claim Rates and Duration Rates 4
3.1 LTC Rate by Industry 4
3.2 LTC Rates by Size of Employer: 2000 5

4. Analysis of the Lost-Time Claims 6
4.1 Nature of Injury 6
4.2 Duration of Disability 7
4.3 Type of Event/Exposure 8
4.4 Part of Body Injured 9
4.5 Source of Injury 10

5. Characteristics of the Injured Worker 11
5.1 Occupation of the Injured Worker 11
5.2 Age of injured Worker 12
5.3 Length of Time Employed 13
5.4 Gender of Injured Worker 13

6. Cost of Claims and Employer Premiums 14

7. Occupational Fatalities 15

8. OHS Investigated Occupational Fatalities: 1996-2000 15

Appendix A: Terms, Definitions, and Formulas 16

Appendix B: Upstream Oil and Gas 2000 Industry Codes 17

1. Introduction

The Mission of Alberta Human Resources and Employment

Alberta Human Resources and Employment's mission is to foster safe and healthy workplaces. Workplace Health and Safety works within the continuum of services provided by Alberta Human Resources and Employment. Its focus is on the development and implementation of strategies and initiatives aimed at meeting the department's goal that Alberta will have a fair, safe and healthy work environment. To this end, Alberta Human Resources and Employment recognizes that monitoring workplace health and safety will help to ensure that primary concerns are actively managed and that resources are directed where needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1996 to 2000. Cost of the injuries and revenue in terms of total premiums paid by employers. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Occupation Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.
Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Tar Sands sub-sector.

2. Sub-Sector Description

Sub-Sector # 6: Tar Sands

Mining & Processing of Bituminous Sands for Oil Extraction (Industry # 06600)
The industry covers employers engaged in both the mining and the processing of bituminous sands which at this time is exclusive to the Athabasca oil sands deposits.

This is an open pit mining process that removes oil-laden sand from the earth and transports this sand to an extraction plant.

Draglines with booms measuring over 100 metres, are equipped with enormous buckets that dig up the oil sand. Bucket wheel excavators, equipped with a series of toothed bucket on a revolving wheel, are used to scoop up the sand and put it on conveyors or loaded onto specialized trucks for transport to an extraction plant. Bitumen is then separated from the sand, in the plant, by a series of automated units using steam and chemical agents. Once the raw bitumen is separated, it is upgraded into synthetic crude oil because it contains impurities, and it is too thick and heavy to flow through pipelines.

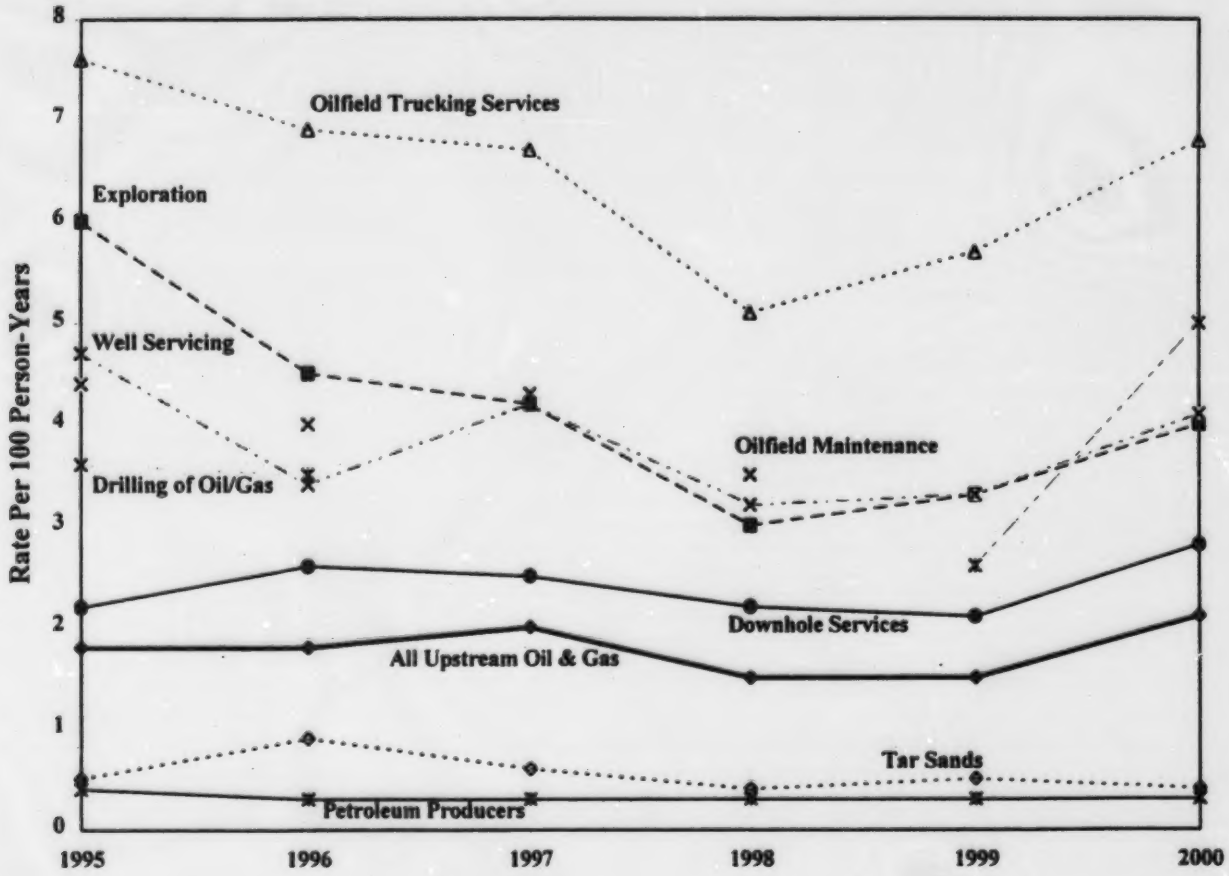
Upgrading units include the coker that breaks down the bitumen into smaller molecules and the fractionator, which separates the bitumen products into gas, naphtha and gas-oil molecules, removing the impurities. Upgrading plants are comparable to oil refineries in many ways. The end product, synthetic crude oil, is shipped to refineries for further processing into other products such as gasoline, jet fuel and lubricating oil.

Research & Development, Oil Sands & Heavy Oil Recovery (Industry # 06601)
Employers in this industry specialize in research and development into new technologies for recovering oil from heavy oil deposits and bituminous sand through 'in situ' or 'well' recovery methods.

Employers will design and operate test facilities for the research and development purpose. This is purely a research industry and is not intended for exploration or commercial processing activities. Once employers begin operating on a commercial basis, the operation would be classified in industry 06300.

Contract operators may be engaged to operate test facilities and would be classified along with other upstream production operators in industry 06305.

Lost-Time Claim Rates
Upstream Oil & Gas Subsectors
Alberta: 1995-2000



3. Lost-Time Claim Rates and Duration Rates

Tar Sands

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1996	11	$132,309	6,051	539	9	54	0.9
1997	11	$145,657	6,025	702	12	35	0.6
1998	14	$52,662	6,921	306	N/A	26	0.4
1999	16	$99,510	6,978	562	8	32	0.5
2000	15	$486,720	6,485	725	N/A	26	0.4

3.1 LTC Rate by Industry

6600-Mining & Processing of Bituminous Sand

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	ITCs	LTC Rate
1996	8	$131,691	6,023	536	9	53	0.9
1997	8	$145,657	6,002	702	12	35	0.6
1998	11	$52,662	6,900	306	N/A	26	0.4
1999	12	$99,510	6,958	562	8	32	0.5
2000	12	$486,720	6,467	725	N/A	26	0.4

6601-Research/Development of Oil Sands & Heavy Oil Recovery

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1996	3	$618	28	3	N/A	1	N/A
1997	3	$0	23	0	N/A	0	N/A
1998	3	$0	22	0	N/A	0	N/A
1999	4	$0	20	0	N/A	0	N/A
2000	3	$0	17	0	N/A	0	N/A

3.2 LTC Rates by Size of Employer: 2000

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0<= PYs < 1	4	N/A	2	N/A
B: 1<= PY < 5	2	N/A	5	N/A
C: 5 <= PYs < 10	3	2	19	N/A
D: 10 <= PYs < 20	1	N/A	15	N/A
E: 20 <= PYs < 40	1	N/A	23	N/A
F: 40 <= PYs < 100	1	N/A	49	N/A
G: PYs >=100	3	24	6,372	0.4
Total	15	26	6,485	0.4

4. Analysis of the Lost-Time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
SPRAIN, STRAIN, TEARS	22	10	15	11	11	69	39.9
SYSTEMATIC DISEASES, DISORDERS	13	6	3	2	2	26	15.0
SURFACE WOUNDS, BRUISES	6	3	2	7	4	22	12.7
FRACTURE/DISLOCATION	5	6	.	2	3	16	9.2
OTHER TRAUMATIC INJURY/DISEASE	1	3	2	4	3	13	7.5
OPEN WOUNDS	3	4	2	1	1	11	6.4
BURNS	1	1	1	3	1	7	4.0
NATURE - UNS	2	1	1	2	1	7	4.0
OTHER DISEASE/DISORDERS	1	.		.	.	1	0.6
SYMPTONS, SIGN/ILLNESS	.	1	.	.	.	1	0.6
Total	54	35	26	32	26	173	100.0

4.2 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
01 - 05 DAYS LOST	21	10	4	12	7	54	31.2
06 - 10 DAYS LOST	4	3	4	1	5	17	9.8
11 - 15 DAYS LOST	4	3	2	2	.	11	6.4
16 - 20 DAYS LOST	1	2	1	2	1	7	4.0
21 - 30 DAYS LOST	3	3	2	.	1	9	5.2
31 - 40 DAYS LOST	1	.	1	2	1	5	2.9
41 - 50 DAYS LOST	.	.	3	1	2	6	3.5
51 OR MORE DAYS LOST	4	6	.	3	4	17	9.8
DAYS LOST-UNSPECIFIED	16	8	9	9	5	47	27.2
Total	54	35	26	32	26	173	100.0

4.3 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
UNKNOWN	2	1	1	.	2	6	3.5
EXPOSURE TO HARMFUL SUBSTANCES	12	8	2	7	3	32	18.5
OVEREXERTION	8	3	5	5	1	22	12.7
FALL ON SAME LEVEL	6	2	3	4	5	20	11.6
STRUCK BY OBJECTS	5	5	1	3	4	18	10.4
BODILY REACTION	7	1	2	5	3	18	10.4
TRANSPORTATION ACCIDENTS	4	3	6	2	3	18	10.4
FALL TO LOWER LEVEL	.	5	2	2	2	11	6.4
CAUGHT IN OBJECTS	4	3	.	.	2	9	5.2
REPETITIVE MOTIONS	2	2	1	.	.	5	2.9
STRUCK AGAINST OBJECTS	1	1	1	1	.	4	2.3
RUBBED OR ABRAIDED	1	.	.	2	.	3	1.7
OTHER FALLS	1	1	.	1	.	3	1.7
FIRES AND EXPLOSIONS	1	.	1	.	.	2	1.2
OTHER BODILY REACTION/EXERTION	.	.	1	.	.	1	0.6
ASSAULT/VIOLENT ACT BY PERSON	.	.	.	.	1	1	0.6
Total	54	35	26	32	26	173	100.0

4.4 Part of Body Injured

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
BACK	14	7	9	8	4	42	24.3
OTHER HEAD	15	7	3	2	4	31	17.9
LEG(S)	8	2	4	4	1	19	11.0
ANKLE(S) & FOOT(FEET)-NOT TOES	7	6	1	1	3	18	10.4
OTHER TRUNK	.	3	2	6	5	16	9.2
OTHER UPPER EXTREMITIES	2	1	3	4	1	11	6.4
MULTIPLE BODY PARTS	1	2	1	3	3	10	5.8
NECK	2	1	2	.	2	7	4.0
HAND(S)	2	2	1	.	1	6	3.5
FINGER(S)	2	2	.	.	1	5	2.9
EYE(S)-OPTIC NERVE,VISION	.	.	.	3	1	4	2.3
OTHER LOWER EXTREMITIES	.	2	.	.	.	2	1.2
OTHER BODY PARTS	1	.	.	.	.	1	0.6
BODY SYSTEMS	.	.	.	1	.	1	0.6
Total	54	35	26	32	26	173	100.0

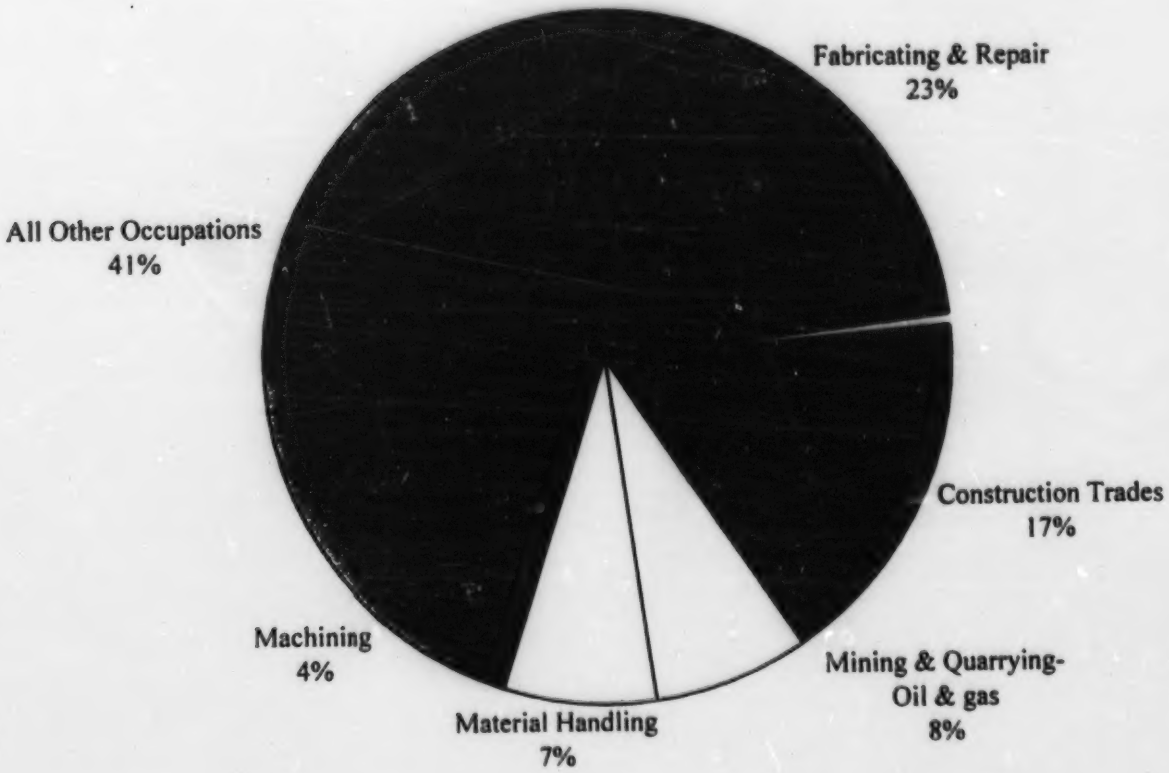
4.5 Source of Injury

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
STRUCTURES/SURFACES	7	8	5	6	5	31	17.9
OTHER SOURCES	13	4	1	8	4	30	17.3
PERSONS-INJURED WORKER	9	3	4	5	4	25	14.5
UNKNOWN	9	7	1	1	2	20	11.6
VEHICLES	6	3	5	1	4	19	11.0
PARTS & MATERIALS	3	4	2	2	3	14	8.1
MACHINERY	2	1	2	2	.	7	4.0
CHEMICAL/CHEMICAL PRODUCTS	.	3	1	2	1	7	4.0
HANDTOOLS-UNPOWERED	4	1	1	.	.	6	3.5
OTHER TOOLS/EQUIPMENT	.	1	1	1	1	4	2.3
CONTAINERS	1	.	.	2	.	3	1.7
MINERAL-METALS/NONMETALS	.	.	1	.	1	2	1.2
PERSONS-NOT THE INJURED WORKER	.	.	1	.	1	2	1.2
HANDTOOLS-POWERED	.	.	1	1	.	2	1.2
FURNITURE & FIXTURES	.	.	.	1	.	1	0.6
Total	54	35	26	32	26	173	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker

Occupation of the Injured Worker
1996-2000



5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
15-19 YEARS	.	1	1	1	.	3	1.7
20-24 YEARS	1	.	1	1	.	3	1.7
25-34 YEARS	9	5	4	3	5	26	15.0
35-44 YEARS	22	18	9	11	10	70	40.5
45-54 YEARS	15	9	9	13	11	57	32.9
55-64 YEARS	6	2	2	3	.	13	7.5
65 YRS AND OVER	1	.	.	.	.	1	0.6
Total	54	35	26	32	26	173	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
B. 1 MONTH TO < 6 MONTHS	.	1	1	2	.	4	2.3
C. 6 MONTHS TO < 1 YEAR	.	.	1	1	2	4	2.3
D. 1 YEAR OR MORE	33	21	16	21	20	111	64.2
E. TIME-UNSPECIFIED	21	13	8	8	4	54	31.2
Total	54	35	26	32	26	173	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
B. 1 MONTH TO < 6 MONTHS	.	1	1	2	.	4	2.3
C. 6 MONTHS TO < 1 YEAR	.	.	1	1	2	4	2.3
D. 1 YEAR OR MORE	33	21	16	21	20	111	64.2
E. TIME-UNSPECIFIED	21	13	8	8	4	54	31.2
Total	54	35	26	32	26	173	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 6 - Tar Sands

	Occurrence Year 1996	1997	1998	1999	2000
Transaction Year					
1996	$116,332				
1997	$212,734	$106,468			
1998	$11,317	$161,791	$66,470		
1999	$4,598	$33,334	$55,045	$159,420	
2000	$7,272	$34,707	$14,439	$134,292	$460,176
Total cost	$352,252	$336,299	$135,955	$293,712	$460,176
Total Premiums	$1,739,810	$2,214,956	$1,339,409	$1,035,131	$1,022,748

The above cost of lost-time claims and premiums are for the five-year period 1996 through to 2000. The data is as of May 4, 2001.

The claim cost reflects only paid cost on lost-time claims that occurred in the five-year period. These costs are tracked by year of occurrence and the year that the costs were transacted.

The premiums are the total premiums paid by employers for each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Tar Sands Workplace Fatalities Accepted by the WCB

There were no workplace fatalities accepted by workers' Compensation Board in this sub-sector for the period 1996 through 2000.

8. OHS Investigated Occupational Fatalities: 1996-2000

There were no investigated workplace fatalities in this sub-sector for the period 1996 through 2000.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim

A lost-time claim (LTC) is a claim for an occupational injury or disease, which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years

Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Human Resources and Employment uses these data to estimate an average industry wage, and uses the average industry wage and employer payroll data to estimate person-years for each employer and each industry. One person-year is equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate

The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represents the probability or risk of disabling injury or disease to a worker during a period of one-year work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs X 100}}{\text{Estimated Person-years}}$$

Duration (Days Lost)

The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Human Resources and Employment obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate

The duration rate is calculated by dividing the number of workdays lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as days lost per 100 person-years worked, and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days X 100}}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality

An occupational fatality is the death of a worker which resulted from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC

Means 'Not Elsewhere Classified'.

UNS

Means 'Unspecified'.

Appendix B: Upstream Oil and Gas 2000 Industry Codes

Sub-Sector 1: **Exploration**
Industries:
09200~Seismic Geophysical/Mineral Exploration
09201~Shot Hole Drilling

Sub-Sector 2: **Oilfield Maintenance and Construction**
Industries:
06304~Oilfield Construction and/or Maintenance

Sub-Sector 3: **Well Servicing With Service Rigs**
Industries:
09903~Well servicing with Service Rigs including Power Swivels

Sub-Sector 4: **Drilling of Oil and gas Wells**
Industries:
09600~Drilling of Oil & Gas Wells

Sub-Sector 5: **Downhole & Other Oilfield Services**
Industries
06305~Field Production Operators
06306~Vacuum Removal of Waste
09900~Mud Logging
09902~Pressure Cleaning Services
09904~Rathole Drilling and Rig Anchoring
09911~Oilfield Downhole Services
09915~Well Casing Services
09921~Servicing Christmas Trees On Oil Wells
09927~Liquid Waste Treatment & Disposal

Sub-Sector 6: **Tar Sands**
Industries:
06600~Mining & Processing of Bituminous Sand
06601~Research/Development, Oil Sands and Heavy Oil Recovery

Sub-Sector 7: **Oil & Gas Exploration/Development**
Industries:
06300~Oil and Gas Exploration & Development-Upstream Operations

Sub-Sector 8: **Oilfield Trucking Services**
Industries:
50720~Oilfield Trucking Services

For further information contact:

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Alberta Workplace Health and Safety website:
http://www.whs.gov.ab.ca